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ART UNIT		PAPER NUMBER		
		1756		

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/606,750	TODA ET AL.
	Examiner	Art Unit
	Janis L. Dote	1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 08 September 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-28 is/are pending in the application.
 4a) Of the above claim(s) 24-26 is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-23,27 and 28 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) 1-28 are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 27 June 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 6/27/03; 2/10/05; 2/28/05; 7/19/05; 10/11/05

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____

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1. The examiner acknowledges the amendments to claims 1, 9, 12, 17, 19, and 23, and the addition of new claims 27 and 28 set forth in the amendment filed on Sep. 8, 2005. Claims 1-28 are pending.

Claims 24-26 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicants timely traversed the restriction (election) requirement in the reply filed on Nov. 23, 2005.

2. The "Amendment to the claims" section filed on May 25, 2005, did not comply with 37 CFR 1.121 for the reasons discussed in the "Notice of non-compliant amendment" mailed on Aug. 8, 2005. Accordingly, the "Amendment to the claims" section filed on May 25, 2005, has not been entered.

3. The examiner has considered the US application listed on "List of related cases" in the Information Disclosure statements filed on Feb. 28, 2005, Jul. 19, 2005, and Oct. 11, 2005.

The examiner has crossed out the US patents listed on "List of related cases" in the Information Disclosure statements filed on Jun. 27, 2003, because those US patents, which are listed on

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the form PTO-1449 filed on Jun. 27, 2003, have already been considered.

The examiner has only considered the material submitted by applicants, i.e., copies of the originally filed claims, abstract, and drawings of the US applications, provided by applicants on Feb. 10, 2005, listed in the "List of related cases" in the Information disclosure statement (IDS) filed on Jun. 27, 2003.

4. The objection to the specification set forth in the office action mailed on Jan. 25, 2005, paragraph 6, has been withdrawn in response to the amended paragraph beginning at page 58, line 13, of the specification, filed on May 25, 2005.

The rejections of claims 9, 19, and 23 under 35 U.S.C. 112, second paragraph, set forth in the office action mailed on Jan. 25, 2005, paragraph 10, have been withdrawn in response to the amendments to claims 9, 19, and 23 set forth in the amendment filed on Sep. 8, 2005.

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

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In claim 5, the recitation "a lowest angle peak at an angle of $7.3^\circ \pm 0.2^\circ$, and wherein an interval between the lowest angle peak to a next peak at a high angle side is not less than 2.0° " lacks antecedent in the specification. See the amended paragraph beginning at page 6, line 15, of the specification, filed on May 25, 2005, which discloses that the titanyl phthalocyanine has "a lowest angle peak at an angle of $7.3^\circ \pm 0.2^\circ$, and there is no peak between the lowest peak to 9.4° ." The limitation recited in instant claim 5 is broader than the disclosure in the amended paragraph at page 6 because it includes intervals, beside the disclosed interval, such as intervals of no peaks from 7.3° to 12° .

Applicants' arguments filed on May 25, 2005, have been fully considered but they are not persuasive.

Applicants assert that the amended paragraph beginning at page 6, line 15, of the specification, filed on May 25, 2005, overcomes the objection.

However, for the reasons discussed above, that amended paragraph did overcome the objection. Accordingly, the objection stands.

The examiner reminds applicants that to overcome the objection, they merely have to incorporate the objectionable

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originally filed claim language at an appropriate location in the specification.

6. The instant specification at page 12, lines 14-21, discloses that the term "surface roughness" recited in the instant claims "means the ten point mean roughness which can be measured by a method based on JIS B0601. Specifically, the roughness is represented by the difference between the average height of the five projected portions and the average depth of the five recessed portions in a unit length."

7. Applicants are advised that should claim 5 be found allowable, claim 28 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 19 and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(1) Claim 19 recites that the light irradiator can be a combination of a light emitting diode and a laser diode.

The originally filed specification does not provide an adequate written description of said light irradiator. The originally filed specification at page 59, lines 6-10, discloses that "[s]uitable light sources for use in the imagewise light irradiator 5 . . . include . . . light emitting diodes (LEDs), laser diodes (LDs) . . . and the like." The originally filed specification does not disclose that the light irradiator can be a combination of a light emitting diode and a laser diode as recited in instant claim 19.

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(2) Claim 27 recites that the "titanyl phthalocyanine is not an ammonium complex of titanyl phthalocyanine" (emphasis added).

The originally filed specification does not provide an adequate written description of said titanyl phthalocyanine. The originally filed specification at page 6, lines 9-10, discloses that the "charge generation material is preferably a titanyl phthalocyanine." The originally filed specification at page 13, lines 11-15, discloses that "titanyl phthalocyanine (hereinafter referred to as TiOPc) which is one of phthalocyanine pigments and which includes titanium as the center metal thereof is more preferable because of having a high sensitivity." The specification at page 13, lines 15-25, discloses that the "formula of TiOPc is as follows . . ." The originally filed specification does not exclude the use of an ammonium complex of titanyl phthalocyanine. Nor does the originally filed specification disclose that the use of such a titanyl phthalocyanine as a charge generation material is detrimental to the photoreceptor. Moreover, there is no evidence on the present record to show that the use of an ammonium complex of titanyl phthalocyanine as a charge generation material is detrimental to the photoreceptor.

Applicants have not indicated where in the originally filed

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specification there is written support for the limitation "titanyl phthalocyanine is not an ammonium complex of titanyl phthalocyanine" as recited in instant claim 27.

Applicants can only exclude what they possessed. See In re Johnson, 194 USPQ 187 (CCPA 1977). In this instance, the claim limitation that the "titanyl phthalocyanine is not an ammonium complex of titanyl phthalocyanine" was not recognized in the specification as filed. Its use now introduces new concepts, and therefore violates the descriptive requirement of the first paragraph of 35 U.S.C. 112. See Ex parte Grasselli, 231 USPQ 393 (Bd. App. 1983).

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 1-6, 8, 16, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,567,559 (Yang) combined with US 6,623,899 B2 (Takaya).

Yang discloses an electrophotographic photoreceptor comprising an electroconductive aluminum drum, an intermediate layer comprising a polyamide resin, a charge generation layer, and a charge transport layer formed on the charge generation layer using a halogen-free solvent. The charge generation layer

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comprises a polyvinyl butyral resin and a fine dispersion of a titanyl phthalocyanine material having a particle size smaller than 0.3 μm . The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, triphenylamine as the charge transport material, and the solvent toluene. The Yang charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The titanyl phthalocyanine exhibits an X-ray diffraction pattern having a maximum peak at a Bragg angle ($2\theta \pm 0.2^\circ$) of 27.2° , a lowest peak at 7.4° , a peak at 9.5° , and no peak at 26.3° , when a Cu-K α x-ray having a wavelength of 1.54 \AA is used. See col. 6, lines 25-29; col. 7, lines 6-30; example 2 at col. 8, lines 29-57; and Fig. 12. The interval between the peaks at angles of 7.4° and 9.5° meets the limitation "an interval . . . is not less than 2.0° " recited in instant claim 5. The titanyl phthalocyanine material meets the compositional limitations recited in instant claims 3-6 and 28 and the particle size limitation of "not greater than 0.3 μm ," recited in instant claim 2.

Instant claim 8 is written in product-by-process format. Yang does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the Yang titanyl phthalocyanine material exhibits an X-ray

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diffraction spectrum that meets the limitations recited in instant claims 4-6 and 28, and the particle size limitation of "not greater than 0.3 μm " recited in instant claim 2. Therefore, it appears that the titanyl phthalocyanine material disclosed by Yang is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

Yang does not exemplify an intermediate layer having a surface roughness as required in the instant claims. However, Yang does not limit the type of intermediate layer used. Col. 5, line 12.

Takaya teaches the use of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member. Takaya discloses that the intermediate layer has a layer thickness of at least 0.5 μm and comprises aggregated particles of $\text{Al}_2\text{O}_3 \cdot n\text{H}_2\text{O}$, where n is a number of at least 0 representing "a degree of hydration." Col. 3, lines 55-63. Takaya teaches that the intermediate layer preferably has a 10-point surface roughness R_z (according to JIS

B06010) of "0.1 to 1 μm so as to provide improved function of preventing the occurrence of interference fringes sometimes encountered in an electrophotographic apparatus of a digital scheme using coherent light such as laser light as exposure light." Col. 7, lines 1-8. Takaya exemplifies an intermediate layer having a 10-point surface roughness R_z of 0.5 μm . See, for example, example 1, col. 10, lines 13-27. Takaya discloses that its intermediate layer "can be formed in a crack-free state inexpensively and without requiring a special technique by using a coating liquid of a good storage stability." Col. 3, lines 34-37. According to Takaya, prior art intermediate layers comprising a polyamide resin are "liable to have an electrical resistance which is liable to change depending on environmental changes, so that it has been difficult to provide an electrophotographic photosensitive member having stable and excellent potential characteristics in all environments ranging from low temperature/low humidity to high temperature/high humidity." Col. 2, lines 14-27. Takaya discloses that photosensitive members comprising its particular intermediate layer solve the above-mentioned problems of the prior art. Col. 3, lines 27-30. Takaya discloses that such photosensitive members exhibit "excellent potential characteristic and image forming characteristic free from difficulties, such as lower

image density or black spots and fog, over a variety of temperature and humidity environment conditions even at a smaller thickness of photosensitive layer." Col. 3, lines 39-46; example 1, col. 11, lines 12-19; and Table 1 at col. 13, example 1.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the intermediate layer taught by Takaya having a 10-point surface roughness R_z of 0.5 μm as the intermediate layer in the photoreceptor disclosed by Yang. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of interference fringes and exhibits excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions, as taught by Takaya.

The combined teachings of Yang and Takaya meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine material in the charge generation layer disclosed by Yang is dispersed as a fine dispersion having a particle size smaller than 0.3 μm . The particle size of smaller than 0.3 μm is smaller than the Takaya intermediate layer 10-point surface

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roughness of 0.5 μm and is also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang combined with Takaya, as applied to claim 1 above, further combined with US 5,496,671 (Tamura).

Claim 9 is rejected for the reasons discussed in the office action mailed on Jan. 25, 2005, paragraph 15, which are incorporated herein by reference.

13. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang combined with Takaya, as applied to claim 1 above, further combined with US 2002/0076633 A1 (Niimi'633), as evidenced by applicants' admission at page 87, lines 22-23, of the instant specification.

Claims 10-14 are rejected for the reasons discussed in the office action mailed on Jan. 25, 2005, paragraph 16, which are incorporated herein by reference.

14. Claims 17 and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0051654 A1 (Niimi'654) combined with Yang and Takaya.

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Claims 17 and 19-23 are rejected for the reasons discussed in the office action mailed on Jan. 25, 2005, paragraph 17, which are incorporated herein by reference.

15. Applicants' arguments filed on May 25, 2005, with respect to the rejections over Yang set forth in paragraphs 11-14 above have been fully considered but they are not persuasive.

Applicants assert that neither Yang nor Takaya provide motivation to arrive at the instantly claimed photoreceptor, as taught by applicants. Applicants further assert that the Yang ammonium modified titanyl phthalocyanine is different from the titanyl phthalocyanine recited in the instant claims.

Applicants assert that the titanyl phthalocyanine recited in the instant claims has the chemical structure shown at page 13 of the instant specification.

However, the reasons for combining the references do not have to be those of applicants. For the reasons discussed in paragraph 11, above, the Takaya provides reason, suggestion, and motivation to use its intermediate layer as the intermediate layer in the photoreceptor disclosed by Yang. Furthermore, the combined teachings of Yang and Takaya render obvious a photoreceptor that meets the compositional, particle size, and surface roughness limitations recited in the instant claims.

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Moreover, instant independent claim 1 and claims 2 and 9-23, which depend from claim 1, do not exclude the ammonium modified titanyl phthalocyanine disclosed by Yang. Those claims merely recite the presence of "a charge generation material," which encompasses the Yang titanyl phthalocyanine. The broad recitation "a titanyl phthalocyanine" in instant claims 3 and 28, and claims 4-8, which depend from on claim 3, also encompasses the ammonium modified titanyl phthalocyanine disclosed by Yang. The instant specification does not clearly state that the term "a titanyl phthalocyanine" recited in the instant claims is defined as that represented by the formula at page 13 of the instant specification. This is evident by the claim language in new claim 27, which states that the "titanyl phthalocyanine is not an ammonium complex of titanyl phthalocyanine." Applicants cannot argue patentability based on limitations that are not present in the instant claims. Accordingly, the Yang ammonium modified titanyl phthalocyanine meets the term "a charge generation material" recited in instant claims 1, 8-14, 16, 17, and 19-23, and also meets the term "a titanyl phthalocyanine" recited in instant claims 3-6, 8, and 28.

Applicants' arguments regarding the surface roughness of the conductive substrate are not without merit. The instant

claims do not require that the photoreceptor comprise a conductive substrate having a particular surface roughness. Instant claim 1 recites that the charge generation material has "an average particle diameter less than a roughness of a surface of either the electroconductive substrate or the intermediate layer" (emphasis added).

Applicants further assert that the alumina disclosed by Niimi'633 "does not have to be α -alumina as asserted by the Examiner based on the specific resistivity."

Applicants' assertion is mere attorney argument that is not supported by any objective evidence on the present record. As stated in the rejection in paragraph 13 above, the Niimi'633 alumina used in the protective layer has the same specific resistivity as the α -alumina disclosed in the instant specification. There is nothing in the present record to show that the Niimi'633 alumina is not an α -alumina as recited in instant claim 13.

Accordingly, the rejections over the combined teachings of Yang and Takaya stand.

16. Claims 1-8, 10-14, 16-20, 22, 23, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission at page 87, lines 22-23, of

the instant specification, combined with US 6,268,096 B1 (Nukada) and Takaya.

Niimi'633 discloses an electrophotographic photoreceptor comprising an electroconductive substrate; an undercoat layer; a charge generation layer; a charge transport layer formed on the charge generation layer using a halogen-free solvent; and a protective layer. The charge generation layer comprises a polyvinyl butyral resin and a bisazo charge generation material. The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, a charge transport compound, and the solvent tetrahydrofuran. The protective layer comprises a charge transport polymer comprising a triarylamine moiety in a side chain and a particulate alumina filler having a specific resistivity of $2.5 \times 10^{12} \Omega \cdot \text{m}$. See refining example 6 at pages 24-25, paragraphs 0346-0351; pages 25-26, paragraphs 0358 to 0367; and example 6 at page 27, paragraphs 0380-0381. The Niimi'633 charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The protective layer in example 6 meets the protective layer limitations recited in instant claims 10-12 and 14.

Niimi'633 does not identify its alumina filler as an "α-alumina" as recited in instant claim 13. However, as

discussed supra, the Niimi'633 alumina filler has a specific resistivity of 2.5×10^{12} $\Omega \cdot \text{m}$. The instant specification discloses an "α-alumina" having a specific resistivity of 2.5×10^{12} $\Omega \cdot \text{m}$. Instant specification, page 87, lines 22-23. Because the Niimi'633 alumina filler has the same specific resistivity as the "α-alumina" disclosed in the instant specification and is used for the same purpose as a filler in a protective layer for a photoreceptor, it is reasonable to presume that the Niimi'633 alumina filler is an "α-alumina" as recited in instant claim 13. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

Niimi'633 further discloses that its photoreceptor may be used as the photoreceptor in an image forming apparatus or a process cartridge. The image forming apparatus comprises at least one image forming unit, which comprises a photoreceptor **1**, a charger **8**, a light irradiator **5**, an image developer **11**, and a transfer device **15**. Page 4, paragraph 0061; Fig. 3; and page 21, paragraphs 0300-0305. Niimi'633 teaches that the light irradiator is preferably a laser diode or a light emitting diode as recited in instant claim 19, and the charger is preferably a contact charger or a proximity charger as recited in instant claims 20 and 22. Page 4, paragraph 0062; and page 21, paragraph 0304. Niimi'633 further teaches that the image

forming apparatus can comprise a plurality of image forming units. See Fig. 7, and pages 22-23, paragraphs 0321-0324. The Niimi'633 process cartridge comprises a photoreceptor **43**, and at least one of a charger **40**, an image irradiator **41**, or an image developer **45**. Page 5, paragraph 0063; Fig. 5; and page 22, paragraph 0319.

Niimi'633 does not exemplify a charge generation layer comprising a charge generation material having an average particle diameter as recited in the instant claims. However, Niima'633 discloses that the charge generation material in the charge transport layer can equally be a phthalocyanine pigment. Page 10, paragraph 0151, line 1-2.

Nukada teaches a titanyl phthalocyanine crystal that exhibits an X-ray diffraction pattern having a maximum peak at a Bragg angle ($2\theta \pm 0.2^\circ$) of 27.3° , a lowest peak at 7.5° , a peak at 9.7° , and no peak at 26.3° . See example 4 at cols. 7-8 and Fig. 4. The interval between the peaks at angles of 7.5° and 9.7° meet the limitation "an interval . . . is not less than 2.0° " recited in instant claim 5. The location of the peaks at angles 7.5° and 9.7° were determined by measuring the positions of the peaks with a ruler and correlating the positions with the x-axis in Fig. 4. The titanyl phthalocyanine crystal comprises uniform particles having an ellipsoidal tabular form, which have

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a primary particle diameter of 0.05 to 0.08 μm and a BET specific surface area of 40 m^2/g . See Example 4. The titanyl phthalocyanine crystal meets the compositional limitations recited in instant claims 3-6, 27, and 28, and the average particle size limitation of not greater than 0.3 μm recited in instant claim 2. Nukada further discloses a charge generating layer where the layer is formed by coating a coating solution comprising a polyvinyl butyral binder resin, the titanyl phthalocyanine crystal of example 1, and a solvent. Col. 9, lines 39-44. According to Nukada, when a photoreceptor comprises a charge generation layer comprising its titanyl phthalocyanine crystal, the photoreceptor has excellent photosensitivity, stability, and durability. Col. 1, lines 60-63; col. 4, lines 44-46; and col. 12, lines 13-26.

Nukada does not explicitly disclose that the X-ray diffraction pattern is obtained when a Cu-K α X-ray having a wavelength of 1.542 \AA is used, as recited in instant claim 4. However, as discussed supra, the X-ray diffraction pattern of the Nukada titanyl phthalocyanine meets the X-ray diffraction pattern recited in instant claims 4-6. Thus, it is reasonable to conclude that the X-ray diffraction pattern disclosed in Nukada is obtained when a Cu-K α X-ray having a wavelength of

1.542 Å is used. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Instant claim 7 is written in product-by-process format. Nukada does not disclose that its charge generation layer is formed by the method recited in the instant claim 7. However, as discussed above, the Nukada titanyl phthalocyanine crystal comprises particles having a primary particle diameter of 0.05 to 0.08 µm. The primary particle diameters of 0.05 to 0.08 µm meet the average particle size limitation of "not greater than 0.3 µm" recited in instant claim 7. Because the Nukada primary particle diameters of 0.05 to 0.08 µm are much smaller than the average particle size limitation of not greater than 0.3 µm recited in instant claim 7, it is reasonable to conclude that the Nukada titanyl phthalocyanine crystal meets the particle size standard deviation of "not greater than 0.2 µm" recited in instant claim 7. Thus, it appears that the charge generation layer disclosed by Nukada is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 7. The burden is on applicants to prove otherwise. Marosi, supra; Thorpe; supra; MPEP 2113.

Instant claim 8 is written in product-by-process format. Nukada does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the Nukada titanyl phthalocyanine material exhibits an X-ray diffraction spectrum that meets the limitations recited in instant claims 4-6 and 28, and the particle size limitation of "not greater than 0.3 μm " recited in instant claim 2. Therefore, it appears that the titanyl phthalocyanine material disclosed by Nukada is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Nukada, to use the charge generation layer coating solution taught by Nukada to form the charge generation layer in the photoreceptor disclosed by Niimi'633, and to use the resultant photoreceptor in the image forming apparatus and process cartridge disclosed by Niimi'633. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that have excellent photosensitivity, stability, and durability.

Niimi'633 also does not exemplify a photoreceptor comprising an undercoat layer having the surface roughness as recited in the instant claims. However, Niimi'633 does not limit the type of undercoat layer used. Page 12, paragraph 0180; and reference claim 22.

Takaya teaches the benefits of using of a particular undercoat layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness R_z of 0.5 μm . The discussion of Takaya in paragraph 11 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the undercoat layer taught by Takaya having a 10-point surface roughness R_z of 0.5 μm as the undercoat layer in the photoreceptor rendered obvious over the combined teachings of Niimi'633 and Nukada, and to use the resultant photoreceptor in the image forming apparatus and process cartridge rendered obvious over the combined teachings of Niimi'633 and Nukada. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent

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potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The combined teachings of Niimi'633, Nukada, and Takaya meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine crystal particles in the charge generation layer taught by Nukada have primary particle diameters of 0.05 to 0.08 μm . The primary particle diameters of 0.05 to 0.08 μm are smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and are also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

Applicants' arguments filed on May 25, 2005, have been fully considered but they are not persuasive.

Applicants assert that none of the references discloses or suggests the instantly claimed photoreceptor. Applicants further assert that the Nukada titanyl phthalocyanine does not have the X-ray diffraction pattern as recited in instant claims 4 and 5.

However, the reasons for combining the references do not have to be those of applicants. For the reasons discussed in the rejection above, Nukada provides reason, suggestion, and

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motivation to use its titanyl phthalocyanine as the charge generation material in the photoreceptor disclosed by Niimi'633. Takaya provides reason, suggestion, and motivation to use the intermediate layer as the intermediate layer in the photoreceptor rendered obvious over the combined teachings of Niimi'633 and Nukada. Furthermore, the combined teachings of Niimi'633, Nukada, and Takaya render obvious a photoreceptor that meets the compositional, particle size, and surface roughness limitations recited in the instant claims.

Moreover, instant independent claim 1 and claims 2 and 9-23, which depend from claim 1, do not exclude the titanyl phthalocyanine disclosed by Nukada. Those claims merely recite the presence of "a charge generation material," which encompasses the Nukada titanyl phthalocyanine. The broad recitation "a titanyl phthalocyanine" in instant claims 3, 27, and 28 and claims 4-8, which depend from on claim 3, also encompasses the titanyl phthalocyanine disclosed by Nukada. Furthermore, as discussed in the rejection above, the Nukada titanyl phthalocyanine has an X-ray diffraction pattern that meets the pattern recited in instant claims 4-6 and 28. Accordingly, the Nukada titanyl phthalocyanine meets the term "a charge generation material" recited in instant claim 1 and also

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meets the term "a titanyl phthalocyanine" recited in instant claims 3-8, 27, and 28.

Applicants further assert that the alumina disclosed by Niimi'633 does not have to be α -alumina as asserted by the examiner based on the specific resistivity.

Applicants' assertion is mere attorney argument that is not supported by any objective evidence on the present record. As stated in the rejection above, the Niimi'633 alumina used in the protective layer has the same specific resistivity as the α -alumina disclosed in the instant specification. There is nothing in the present record to show that the Niimi'633 alumina is not an α -alumina as recited in instant claim 13.

Accordingly, the rejection over the combined teachings of Niimi'633, Nukada, and Takaya stands.

17. Claims 1-6, 8, 10-14, 16-20, 22, 23, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission at page 87, lines 22-23, of the instant specification, combined with (1) Japanese Patent 11-140337 (JP'337), as evidenced by Ladd et al., Structure Determination by X-ray Diffraction, p. 426, and (2) Takaya. See the USPTO English-language translation of JP'337 for cites.

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Niimi'633 discloses an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge as described in paragraph 16 above, which is incorporated herein by reference.

Niimi'633 does not exemplify a charge generation layer comprising a charge generation material having an average particle diameter as recited in the instant claims. However, Niima'633 discloses that the charge generation material in the charge transport layer can equally be a phthalocyanine pigment.

Page 10, paragraph 0151, line 1-2.

JP'337 teaches a dispersion comprising a titanyl phthalocyanine crystal that exhibits an X-ray diffraction pattern having a maximum peak at a Bragg angle ($2\theta \pm 0.2^\circ$) of 27.2° , a lowest peak at 7.3° , a peak at 9.5° , and no peak at 26.3° . The diffraction pattern is obtained by irradiating the titanyl phthalocyanine with a X-ray of Cu-K α having a wavelength of "1.514 Å." Translation, paragraph 0007 and 0050-0051; Fig. 7; and dispersion 2 in paragraph 0053 and in Table 1 at page 39. The interval between the peaks at angles of 7.3° and 9.5° meet the limitation "an interval . . . is not less than 2.0° " recited in instant claim 5. The location of the peaks at angles 7.3° and 9.5° were determined by measuring the positions of the peaks with a ruler and correlating the positions with the

x-axis in Fig. 7. According to JP'337, when the dispersion of titanyl phthalocyanine is used to form a charge generation layer in a photoreceptor, the resulting photoreceptor has high sensitivity even after repeated use. The chargeability of the photoreceptor does not decrease and the residual potential does not increase after repeated use. Translation, paragraph 0006.

The JP'337 reported wavelength of 1.514 Å appears to be a typographic error. The Cu-K α wavelength of 1.514 Å does not appear to exist. It is well-known that the Cu-K α spectra line is a doublet consisting of α 1 (λ = 1.5405) and α 2 (λ = 1.5443). The weighted mean K α line is 1.542 Å, which is the value normally used in Cu-K α X-ray diffraction. See Ladd, p. 426. Accordingly, because JP'337 teaches using the X-ray of Cu-K α and that Cu-K α is known in the art to have mean wavelength of 1.542 Å, it is reasonable to presume that the X-ray diffraction pattern disclosed in JP'337 is determined with Cu-K α having a wavelength of 1.542 Å, as recited in the instant claims. The burden is on applicants to prove otherwise. Fitzgerald, supra.

JP'337 does not explicitly disclose that the titanyl phthalocyanine crystal has an average particle diameter of not greater than 0.3 μ m as recited in instant claim 2. However, JP'337 discloses that the titanyl phthalocyanine is milled with a particular polyvinyl acetal and a solvent. The resultant

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dispersion comprises particles having a mean grain diameter of 0.28 μm . See the translation, Table 1 at page 39, dispersion 2. The dispersion particle size of 0.28 μm is within the range of not greater than 0.3 μm recited in instant claim 2. Thus, it is reasonable to conclude that the titanyl phthalocyanine crystal has an average particle diameter of not greater than 0.3 μm as recited in instant claim 2. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Instant claim 8 is written in product-by-process format. JP'337 does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the JP'337 titanyl phthalocyanine material exhibits an X-ray diffraction spectrum that appears to meet limitations recited in instant claims 4-6 and 28, and the particle size limitation of "not greater than 0.3 μm " recited in instant claim 2. Therefore, it appears that the titanyl phthalocyanine material disclosed by JP'337 is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'337, to use the

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dispersion taught by JP'337 to form the charge generation layer in the photoreceptor disclosed by Niimi'633, and to use the resultant photoreceptor in the image forming apparatus and process cartridge disclosed by Niimi'633. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that have high photosensitivity and stable charging properties and residual potential properties after repeated use.

Niimi'633 also does not exemplify a photoreceptor comprising an undercoat layer having the surface roughness as recited in the instant claims. However, Niimi'633 does not limit the type of undercoat layer used. Page 12, paragraph 0180; and reference claim 22.

Takaya teaches the benefits of using of a particular undercoat layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness R_z of 0.5 μm . The discussion of Takaya in paragraph 11 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the undercoat layer taught by Takaya having a 10-point surface

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roughness R_z of 0.5 μm as the undercoat layer in the photoreceptor rendered obvious over the combined teachings of Niimi'633 and JP'337, and to use the resultant photoreceptor in the image forming apparatus and process cartridge rendered obvious over the combined teachings of Niimi'633 and JP'337. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The combined teachings of Niimi'633, JP'337, and Takaya meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine crystal particles in the charge generation layer taught by JP'337 appear to have a mean particle diameter of 0.28 μm . The mean particle diameter of 0.28 μm is smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and are also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

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18. Claims 1-6, 8, 10, 14-16, and 28 are rejected under 35

U.S.C. 103(a) as being unpatentable over Yang combined with
US 6,399,262 B1 (Oshiba).

Yang discloses an electrophotographic photoreceptor as described in paragraph 11 above, which is incorporated herein by reference.

Yang does not exemplify the use of an electroconductive substrate as recited in instant claims 1 and 15. However, Yang does not limit the type of conductive aluminum drum used.

Col. 5, line 15. Nor does Yang exemplify a photoreceptor comprising a protective layer as recited in instant claim 10.

Oshiba discloses the use of aluminum cylinder having a 10-point average surface roughness (Rz) of 1.0 μm , which is subjected to an alumite process, as an electrophotographic photoreceptors. Col. 30, lines 1-24; and example 26 at col. 41.

The alumite process comprises the step of subjecting the aluminum cylinder to anodic oxidation treatment. Col. 33, lines 39-48. The Oshiba conductive aluminum cylinder meets the conductive substrate limitation recited in instant claim 15.

Oshiba teaches that the photoreceptor further comprises a surface layer that comprises a siloxane resin that has "charge transportability." See example 26. The Oshiba surface layer meets the compositional limitations recited in instant claims 10

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and 14. According to Oshiba, when a photoreceptor comprises the Oshiba conductive substrate and surface layer, the photoreceptor exhibits high surface hardness, high wear resistance, and high flaw resistance. The photoreceptor exhibits consistent electrophotographic properties at high temperature and high humidity during repeated use. The photoreceptor repeatedly produces excellent images, and does not "form a moire during the formation of digital images employing a laser beam and the like." Col. 3, lines 8-15.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Oshiba, to use the Oshiba conductive aluminum cylinder as the aluminum drum in the Yang photoreceptor, and to also incorporate the Oshiba surface layer in the Yang photoreceptor. That person would have had a reasonable expectation of successfully obtaining a photoreceptor drum having the benefits disclosed by Oshiba.

The combined teachings of Yang and Oshiba meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine material in the charge generation layer disclosed by Yang is dispersed as a fine dispersion having a particle size smaller than 0.3 μm . The particle size of smaller than 0.3 μm is smaller than the Oshiba aluminum cylinder surface roughness of

1.0 μm and is also not greater than 2/3 of the roughness of 1.0 μm (i.e., 0.66 μm), as recited in instant claims 1 and 2, respectively.

19. The reference US 2003/0073015 A1 (Tamoto) was published on Apr. 17, 2003, and has a US effective filing date of Nov. 2, 2001, which are both prior to the US filing date of Jun. 27, 2003, of the instant application. The inventive entity of Tamoto differs from that of the instant application. Thus, the reference qualifies as prior art under 35 U.S.C. 102(a) and under 35 U.S.C. 102(e). Accordingly, the reference qualifies also as prior art under 35 U.S.C. 103(a) and 103(c). Rejections based on this reference are set forth infra.

20. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang combined with Takaya, as applied to claim 1 above, further combined with Tamoto.

Yang combined with Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 11 above, which is incorporated herein by reference.

Yang does not exemplify a photoreceptor comprising a protective layer as recited in the instant claims.

Tamoto discloses a particular protective layer that can be used as the protective layer for an electrophotographic photoreceptor. The protective layer comprises a charge transport polymer comprising a triarylamine moiety in a side chain and an α -alumina filler having a specific resistivity of not less than $10^{10} \Omega \cdot \text{m}$. See paragraph 0365, lines 7-11; and the protective layer in example 23 at page 33. The protective layer in example 23 meets the protective layer limitations recited in instant claims 10-14.

According to Tamoto, a photoreceptor comprising its protective layer can stably produce high quality images without blurring even when repeatedly used. The residual potential of the photoreceptor does not increase even when repeatedly used for a long period of time. Paragraphs 0051 and 0055.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Tamoto, to incorporate the protective layer taught by Tamoto in the photoreceptor rendered obvious over the combined teachings of Yang and Takaya, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that provides high quality images without blurring even in repeated use.

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21. Claims 1-23, 27, and 28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 and 20-27 of copending Application No. 10/804,067 (Application'067).

Claims 1-23, 27, and 28 are rejected for the reasons discussed in the office action mailed on Jan. 25, 2005, paragraph 20, which are incorporated herein by reference.

22. Claims 1-23, 27, and 28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-35 of copending Application No. 10/665,155 (Application'155) in view of Takaya and US 4,734,348 (Suzuki).

Claims 1-23, 27, and 28 are rejected for the reasons discussed in the office action mailed on Jan. 25, 2005, paragraph 21, which are incorporated herein by reference.

23. In the response filed on May 25, 2005, applicants did not traverse the rejections set forth in paragraphs 21 and 22 above. The examiner notes that in US application 10/665,155, a notice of allowability was mailed on Sep. 20, 2005, and an issue fee payment was filed on Nov. 3, 2005. The rejections stand.

24. Claims 1-6, 8-10, 15-18, 20-23, 27, and 28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 10/655,280 (Application'280) in view of Takaya and Suzuki.

This is a provisional obviousness-type double patenting rejection.

Reference claim 8, which depends from claim 7, which in turn depends from reference claim 1, recites an image forming apparatus comprising an electrophotographic photoreceptor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer formed on the charge generation layer using the non-halogen solvent of cyclic ethers or aromatic hydrocarbons. The charge transport layer meets the charge transport layer limitations recited in instant claims 1 and 16. The charge generation layer comprises titanyl phthalocyanine crystals that exhibit a X-ray diffraction pattern that meets the X-ray diffraction pattern recited in instant claims 4, 5, and 28. Reference claim 2, which depends on reference claim 1, requires the X-ray diffraction pattern to comprise no peak at a Bragg angle of 26.3°, which meets the X-ray diffraction pattern limitation recited in instant claim 6.

Reference claim 3, which depends from reference claim 1, requires that the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm , which is within the particle size limitation recited in instant claim 2.

Reference claim 4, which depends from reference claim 1, requires that the charge transport layer comprise a polycarbonate having, on the main chain and/or side chain charge thereof, a triarylamine structure, which meets the charge transport polymer limitations recited in instant claim 9.

Reference claim 5, which depend from reference claim 1, requires that the photoreceptor further comprise a protective layer that meets the surface protective layer limitations recited in instant claim 10. Reference claim 9, which depends on reference claim 1, requires that the conductive substrate comprise an oxide film formed by anodizing. The anodized oxide film meets the substrate limitation recited in instant claim 15.

Reference claims 1 and 11-15 recite that the image forming apparatus further comprises a charging unit, a light-irradiating unit, a developing unit, and a transferring unit that meet the charging, light-irradiating unit, developing unit, and transporting unit limitations recited in instant claims 17 and 20-22. Reference claim 10, which depends on reference claim 1, further requires that the image forming apparatus

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comprise a plurality of image forming units, thereby meeting the apparatus limitation recited in instant claim 18. Reference claim 15, which depends from reference claim 1, further requires that the apparatus comprise a detachable cartridge comprising the photoreceptor and a member selected from the group consisting of a charger, an irradiator, and a developer, which meets the unit limitations recited in instant claim 23.

Instant claim 8 is written in product-by-process format. The reference claims do not recite that the titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the titanyl phthalocyanine material recited in the claims of Application'280 exhibits an X-ray diffraction spectrum that meets the limitations recited in instant claims 4-6 and 28, and the particle size limitation of "not greater than 0.3 μm " recited in instant claim 2. Therefore, it appears that the titanyl phthalocyanine material recited in the claims of Application'280 is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

The reference claims do not recite the presence of an intermediate layer located between the electroconductive

substrate and the charge generation layer having a surface roughness as recited in the instant claims.

Takaya teaches the benefits of using of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness R_z of 0.5 μm . The discussion of Takaya in paragraph 11 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the reference claims in Application'280 and the teachings in Takaya, to use the intermediate layer taught by Takaya having a 10-point surface roughness R_z of 0.5 μm between the electroconductive substrate and the charge generation layer in the photoreceptor recited in the reference claims of Application'280, wherein the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm , and the charge transport layer is formed from a non-halogen solvent. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from

difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The reference claims also do not recite that the charge generation layer comprises a polyvinyl acetal binder resin.

Suzuki discloses a polyvinyl acetal resin that meets the limitations recited in instant claims 1, 17, and 23. See Example 11 at col. 13. Suzuki discloses that polyvinyl acetal resin can be used as the binder resin in a single photosensitive layer or in a charge generation layer. Col. 4, lines 10-13. Suzuki discloses that said polyvinyl acetal resin provides photosensitive layers having stably dispersed photoconductive particles and excellent electric properties, such as high sensitivity and low residual potential. Col. 2, lines 10-15, and col. 11, lines 56-60.

It would have been obvious for a person having ordinary skill in the art, in view of subject matter recited in the reference claims of Application'280 and the teachings of Suzuki, to use the Suzuki polyvinyl acetal resin as the binder resin in the charge generation layer in the photoreceptor rendered obvious over the subject matter recited in the reference claims of Application'280 combined with the teachings of Takaya, because that person would have had a reasonable expectation of successfully obtaining a stable titanyl phthalocyanine

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dispersion and a photoreceptor, an image forming apparatus, and a process cartridge that have excellent electric properties, such as high sensitivity and low residual potential, as disclosed by Suzuki.

The subject matter recited in the reference claims of Application'280 combined with the teachings of Takaya and Suzuki meet the surface roughness - particle size relationships recited in instant claims 1 and 2. As discussed supra, the titanyl phthalocyanine crystal particles in the charge generation layer recited in the reference claims of Application'280 have an average primary particle diameter of less than 0.3 μm . The average primary particle diameter of less than 0.3 μm is smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and is also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 2, respectively.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (571) 273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to

Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

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JLD
Nov. 17, 2005

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